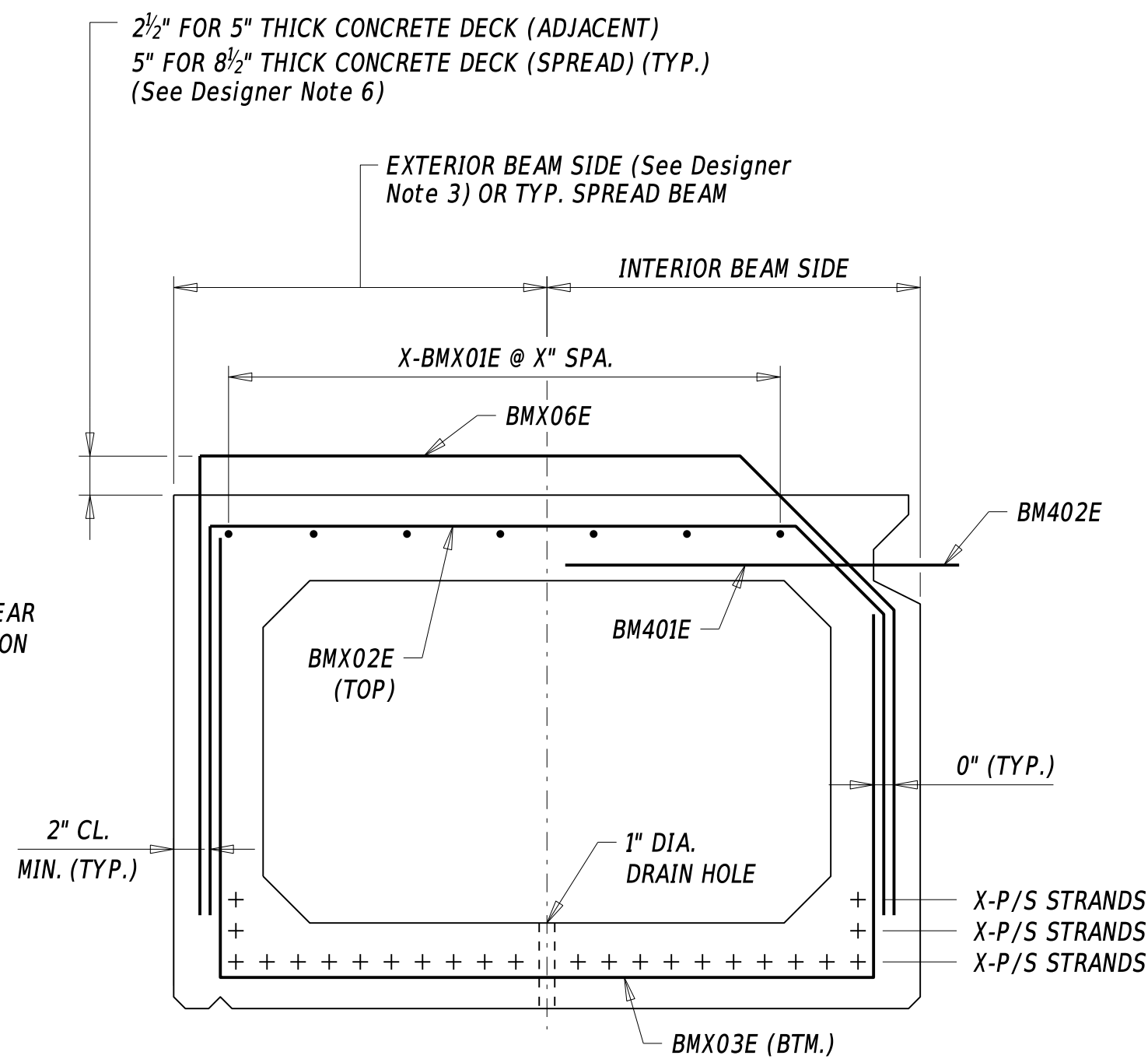


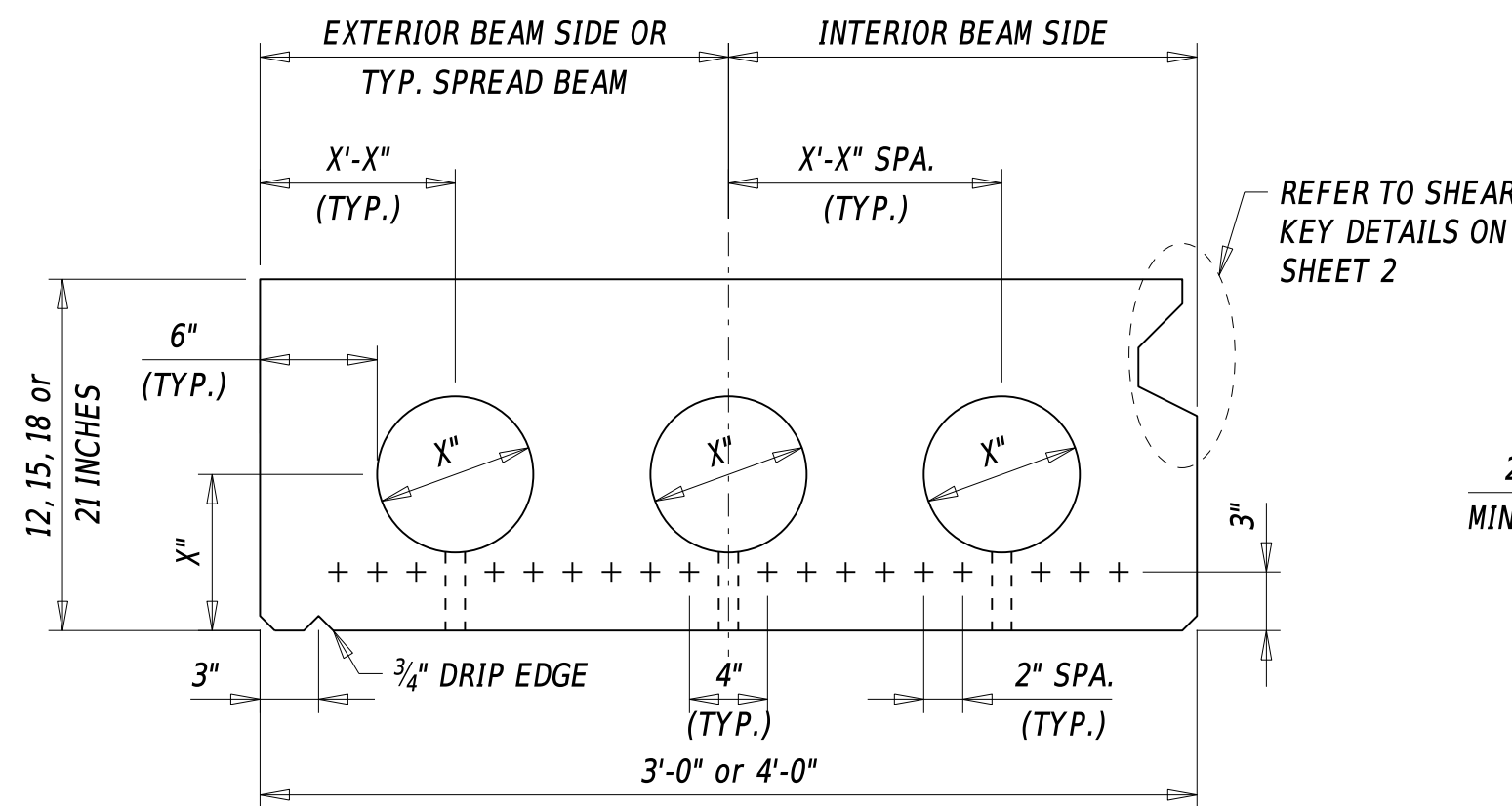
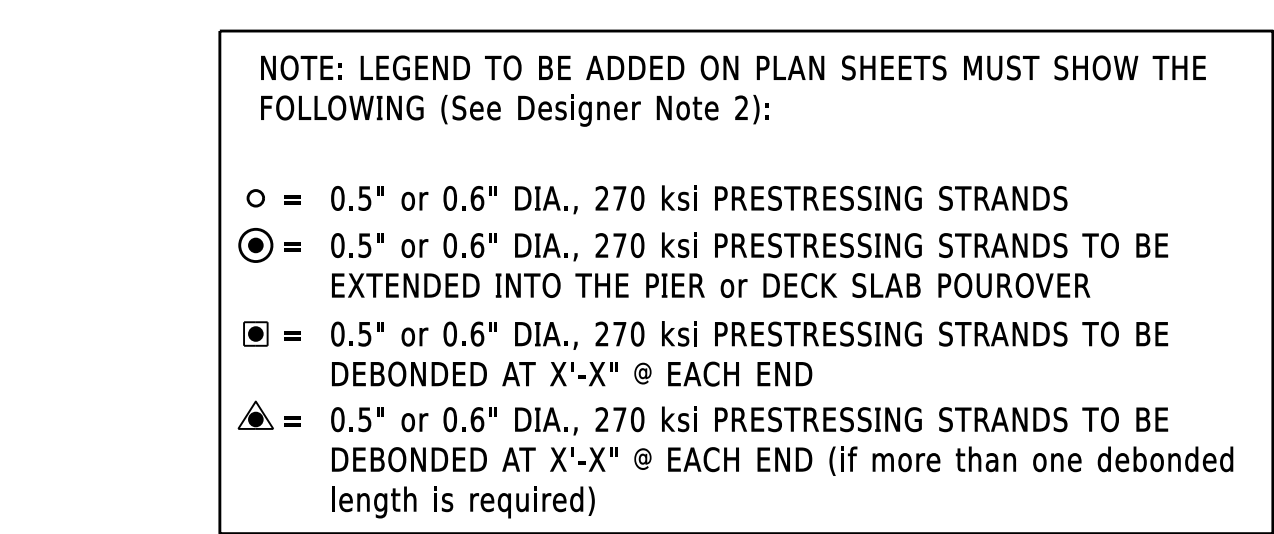
BOX BEAM STRAND CONFIGURATION

NOTE: EXAMPLE SHOWN USING 4'-0" WIDE BEAM.



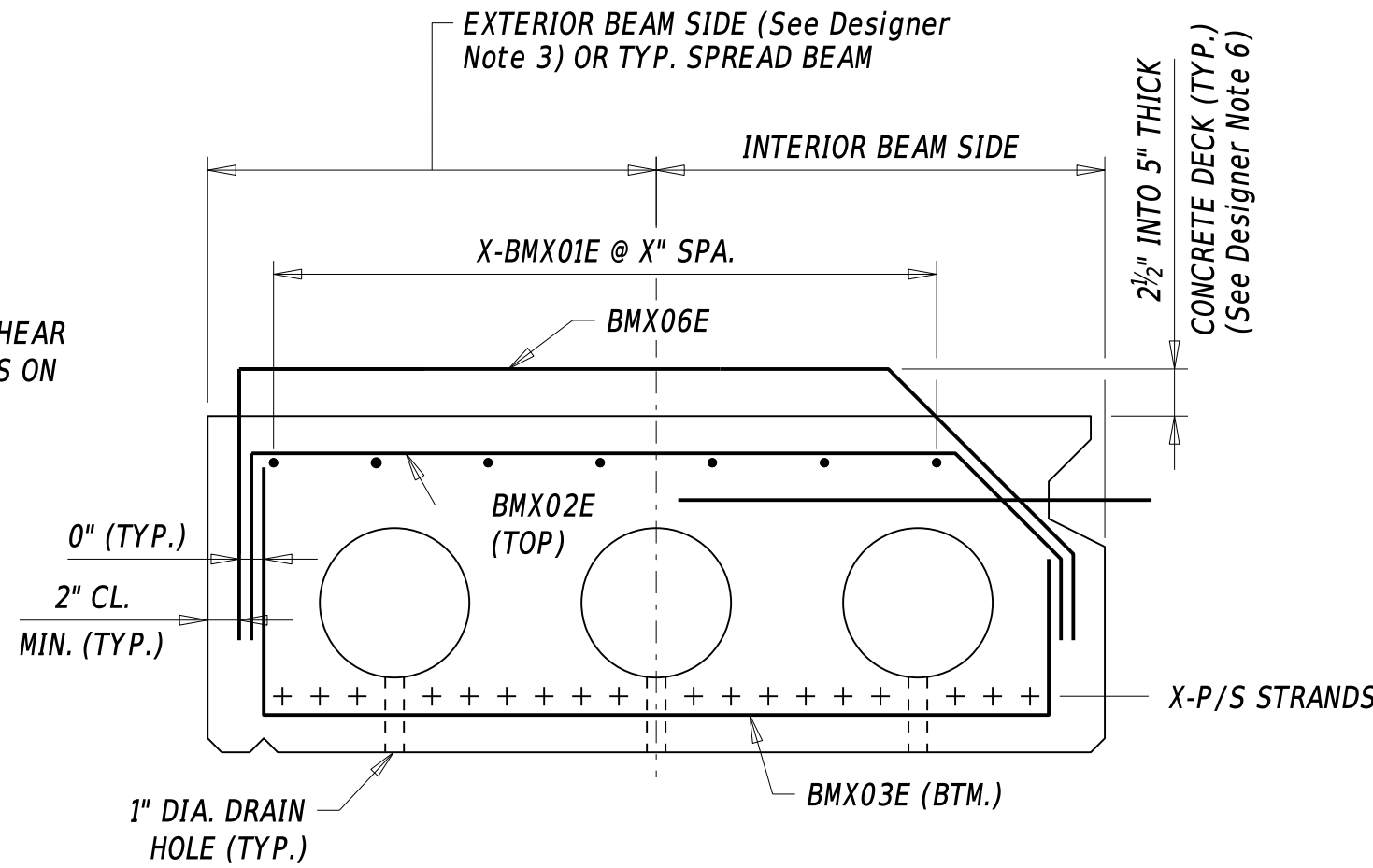
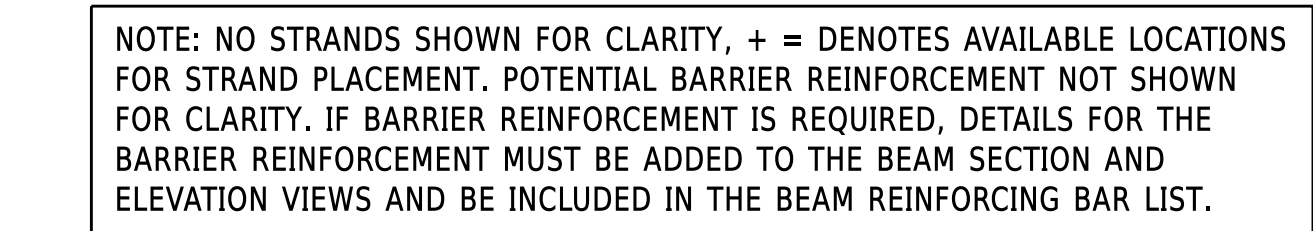
BOX BEAM REINFORCEMENT SECTION

NOTE: BMX06E REINFORCEMENT NOT REQUIRED IF CONCRETE DECK IS NOT USED. TOP LONGITUDINAL BARS (BMX01E) MAY BE PLACED ON TOP OR OUTSIDE OF BMX02E TO MEET DESIGN REQUIREMENTS.



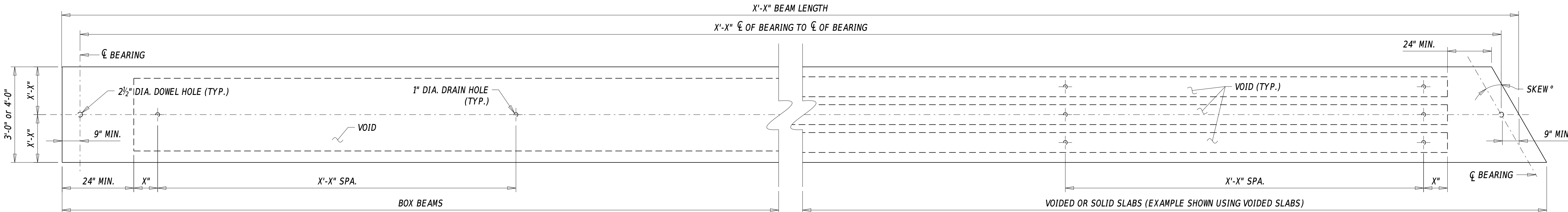
SLAB BEAM STRAND CONFIGURATION

NOTE: EXAMPLE SHOWN USING 4'-0" WIDE BEAM WITH HEIGHT OF 18" UTILIZING 3 CIRCULAR VOIDS. 3'-0" WIDE BEAMS ONLY REQUIRE TWO CIRCULAR VOIDS. THE DESIGNER MAY CONSIDER ELIMINATING VOIDS IN BEAMS WITH HEIGHTS OF 18" OR 21" IF NECESSARY. EXTERIOR CIRCULAR VOID IN EXTERIOR BEAM MAY BE REMOVED TO ACCOMMODATE PROTRUDING BARS FOR BARRIERS. IT IS RECOMMENDED THAT CIRCULAR VOIDS HAVE A DIAMETER OF 8 INCHES. BEAMS WITH HEIGHTS OF 12" AND 15" WILL BE SOLID SLABS (NO VOIDS).



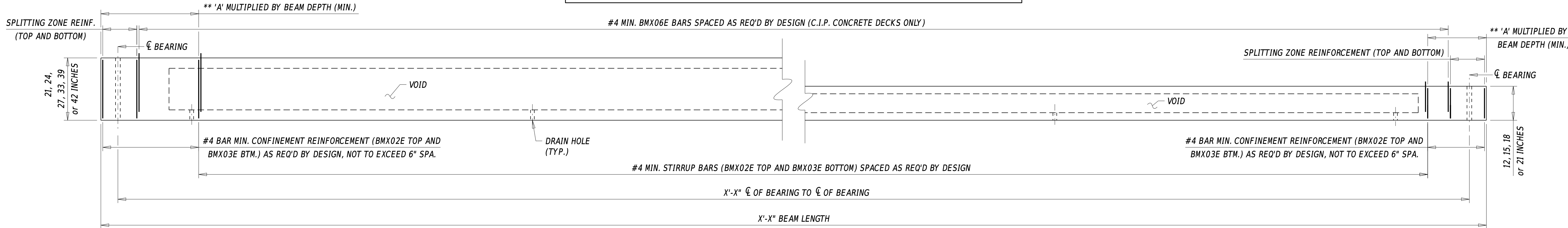
SLAB BEAM REINFORCEMENT SECTION

NOTE: FOR SOLID SLABS, BMX03E AND BMX06E REINFORCEMENT SHOULD BE COMBINED INTO ONE BAR BEND IN ORDER TO REDUCE REBAR CONGESTION. BMX06E REINFORCEMENT NOT REQUIRED IF CONCRETE DECK IS NOT USED. TOP LONGITUDINAL BARS (BMX01E) MAY BE PLACED ON TOP OR OUTSIDE OF BMX02E TO MEET DESIGN REQUIREMENTS.



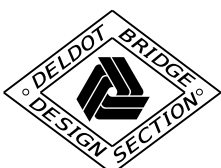
PLAN VIEW

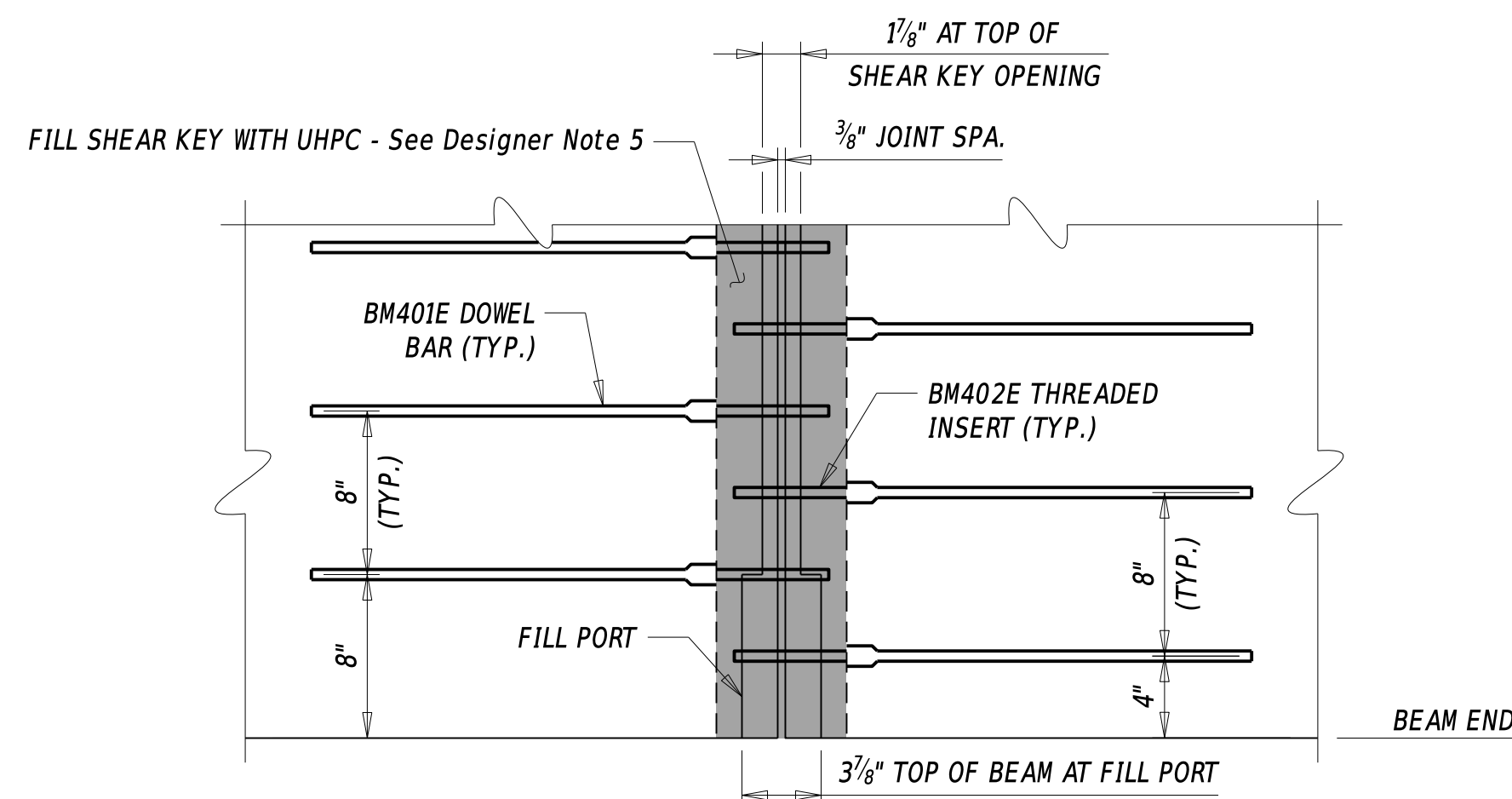
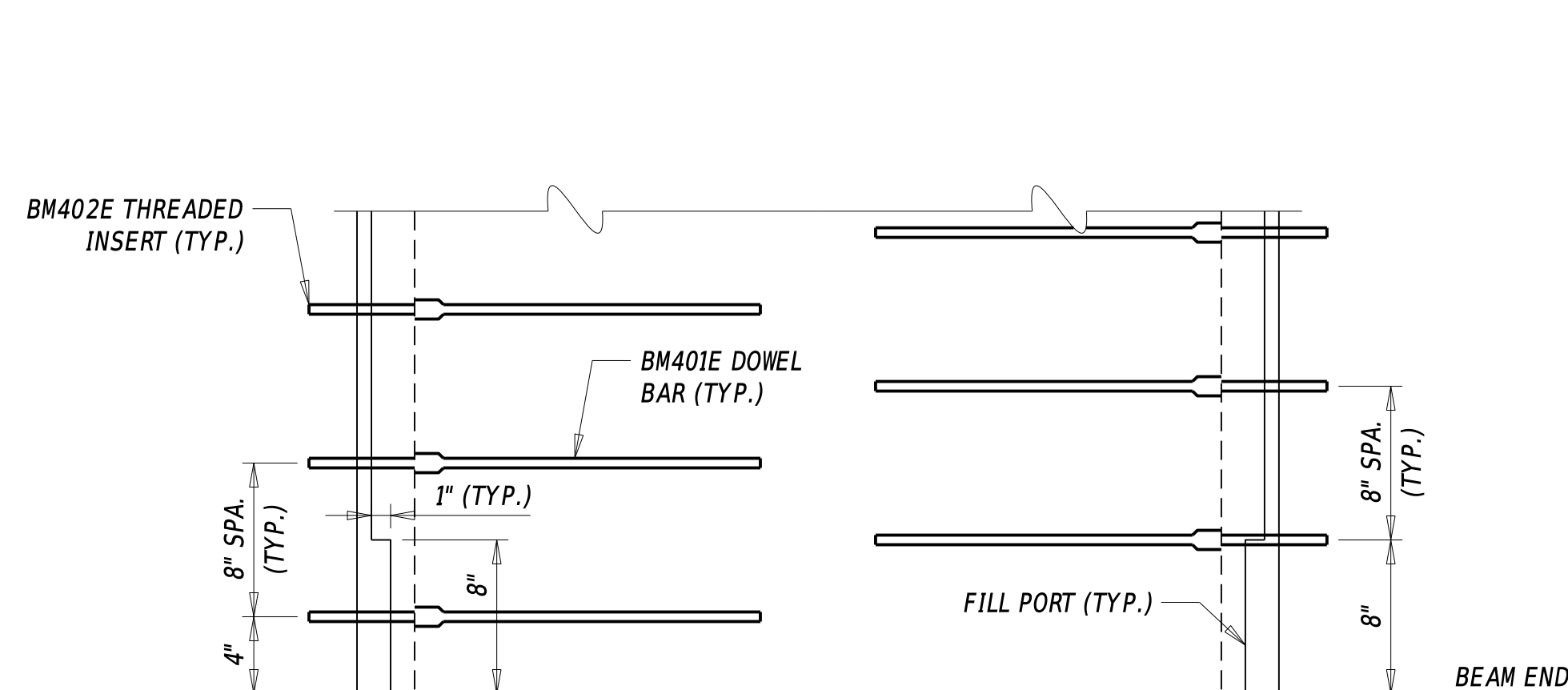
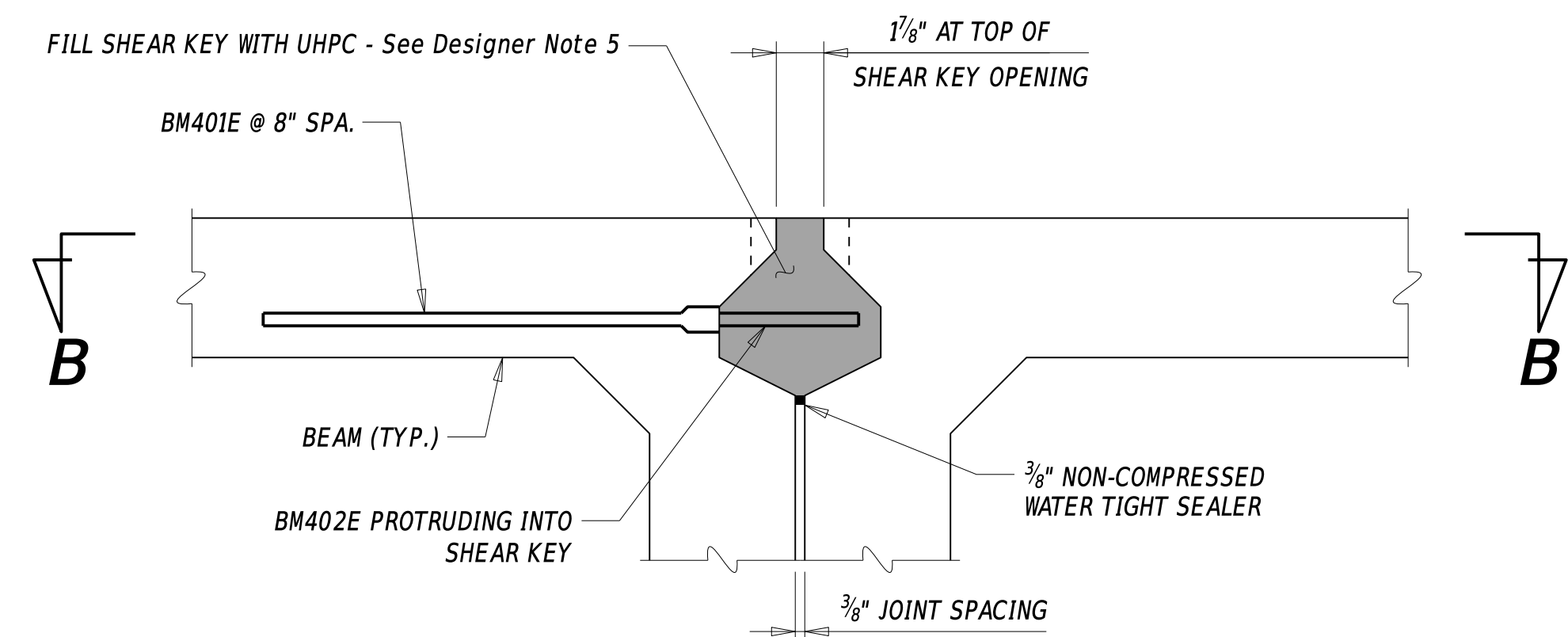
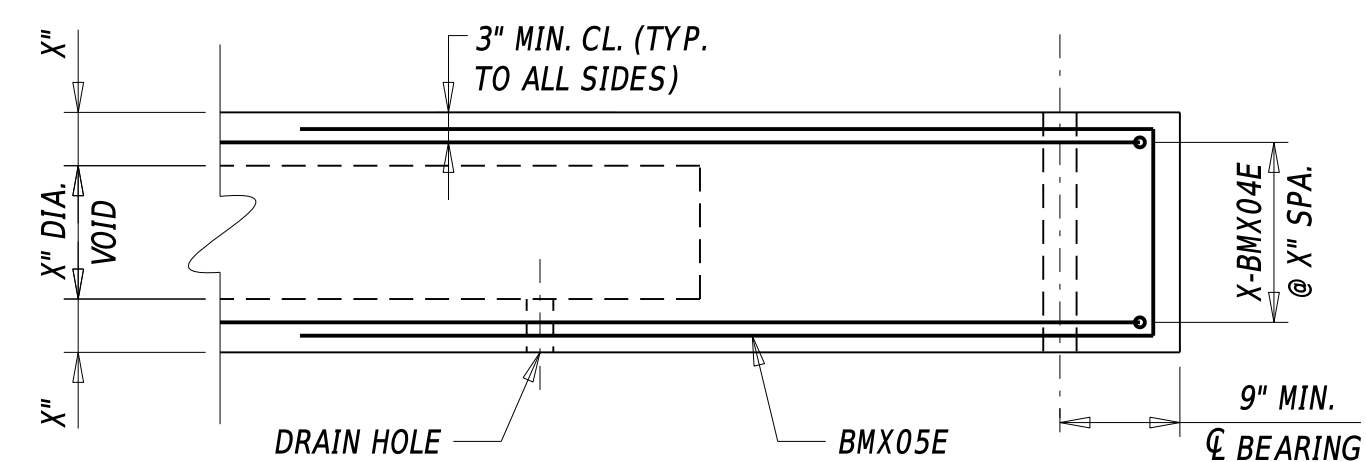
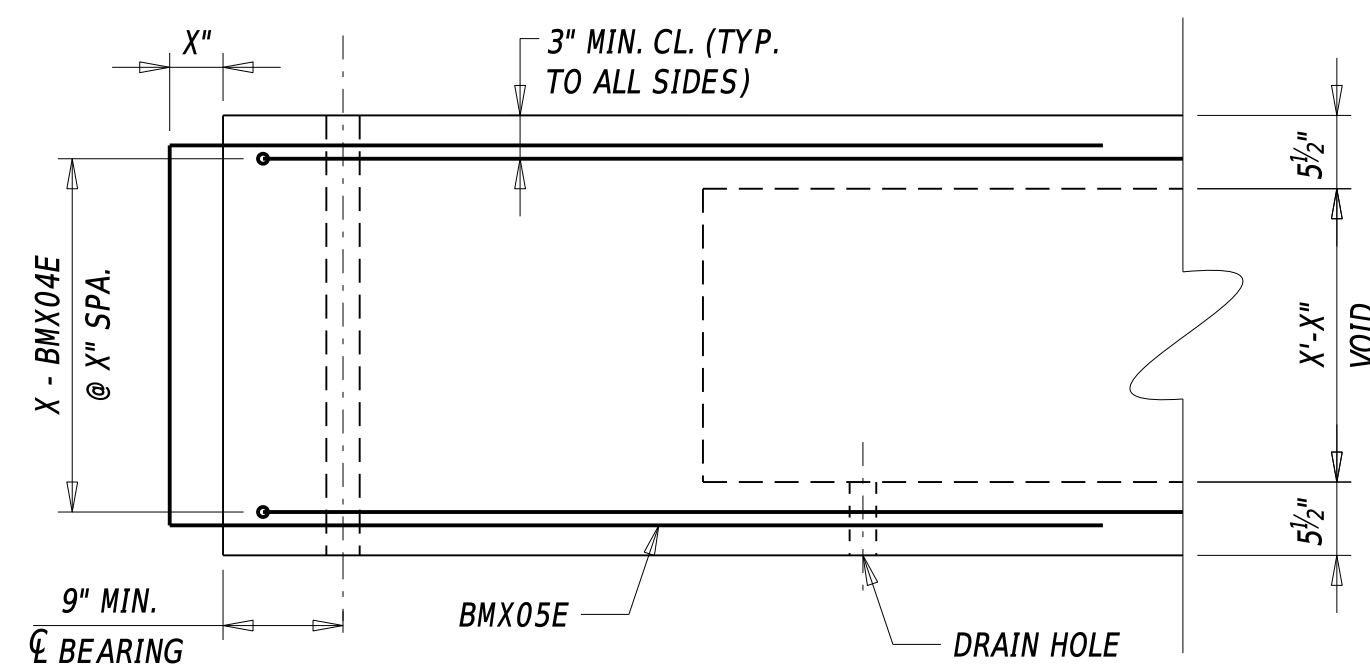
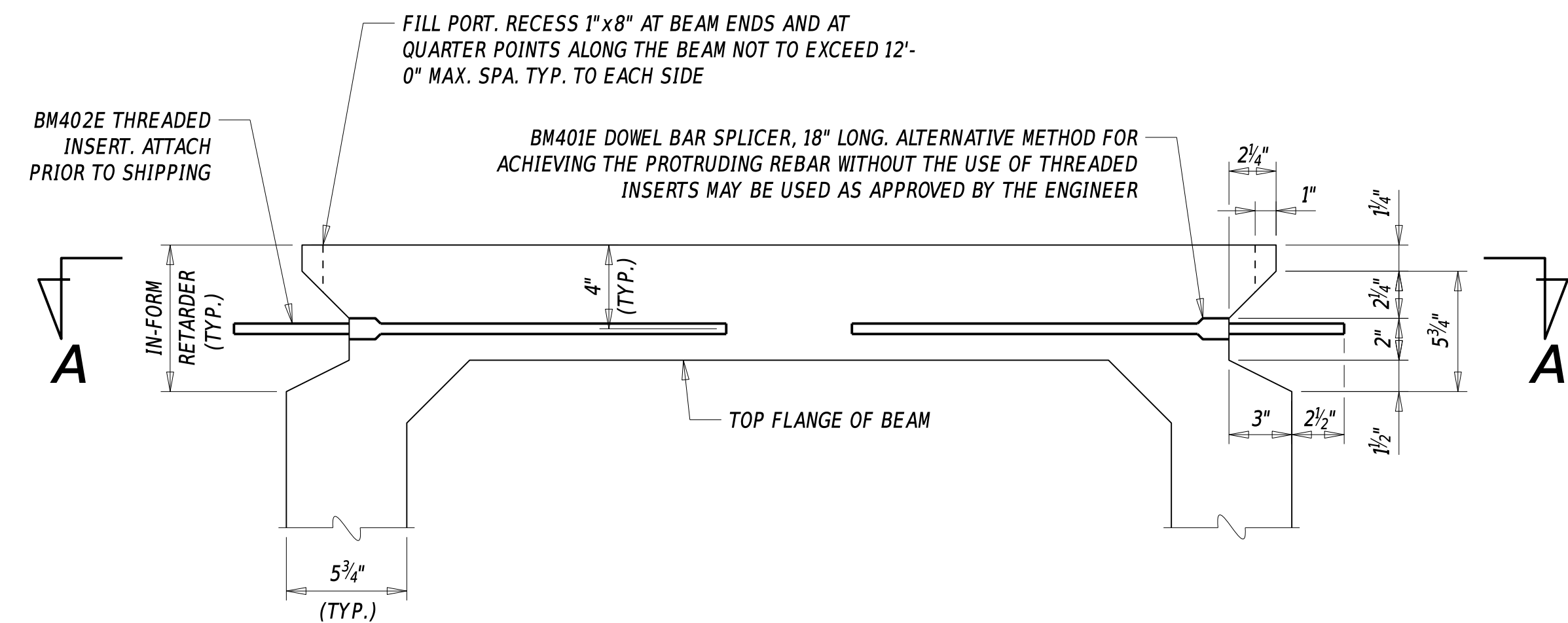
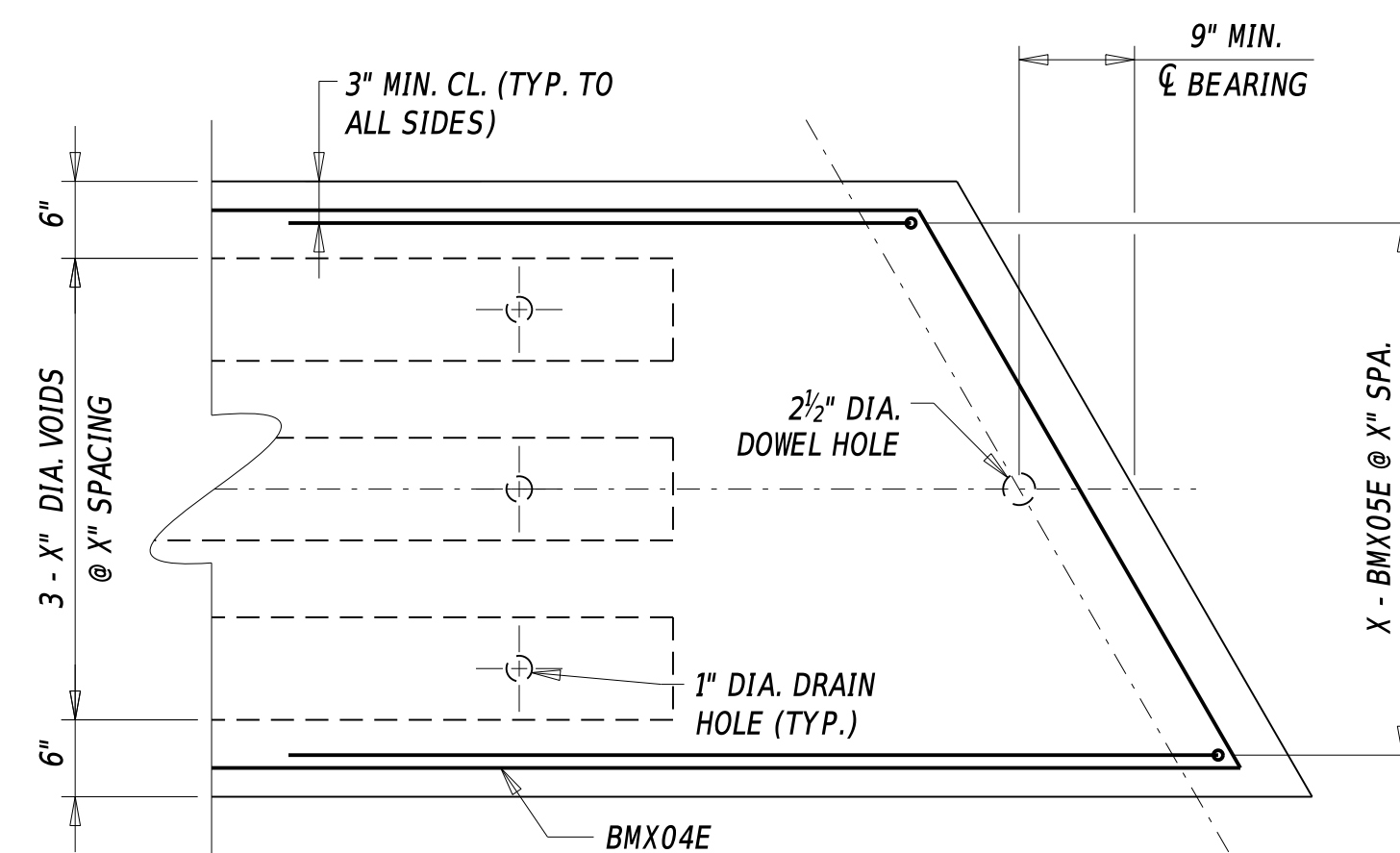
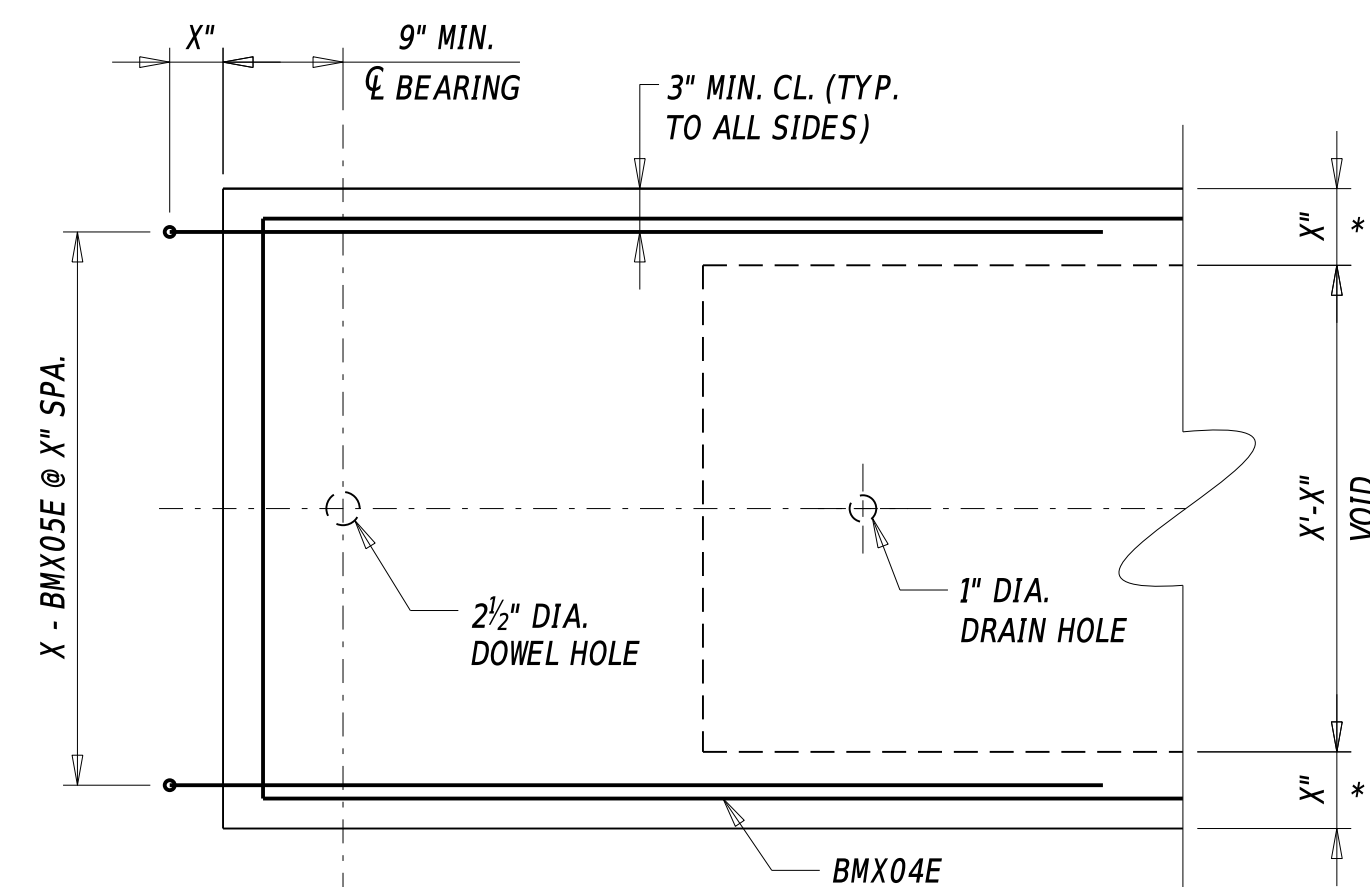
NOTE: SHEAR KEY FOR ADJACENT BEAMS NOT SHOWN FOR CLARITY. REFER TO SHEET 2 FOR SHEAR KEY DETAILS.



ELEVATION

NOTE: BMX01E BARS NOT SHOWN FOR CLARITY.



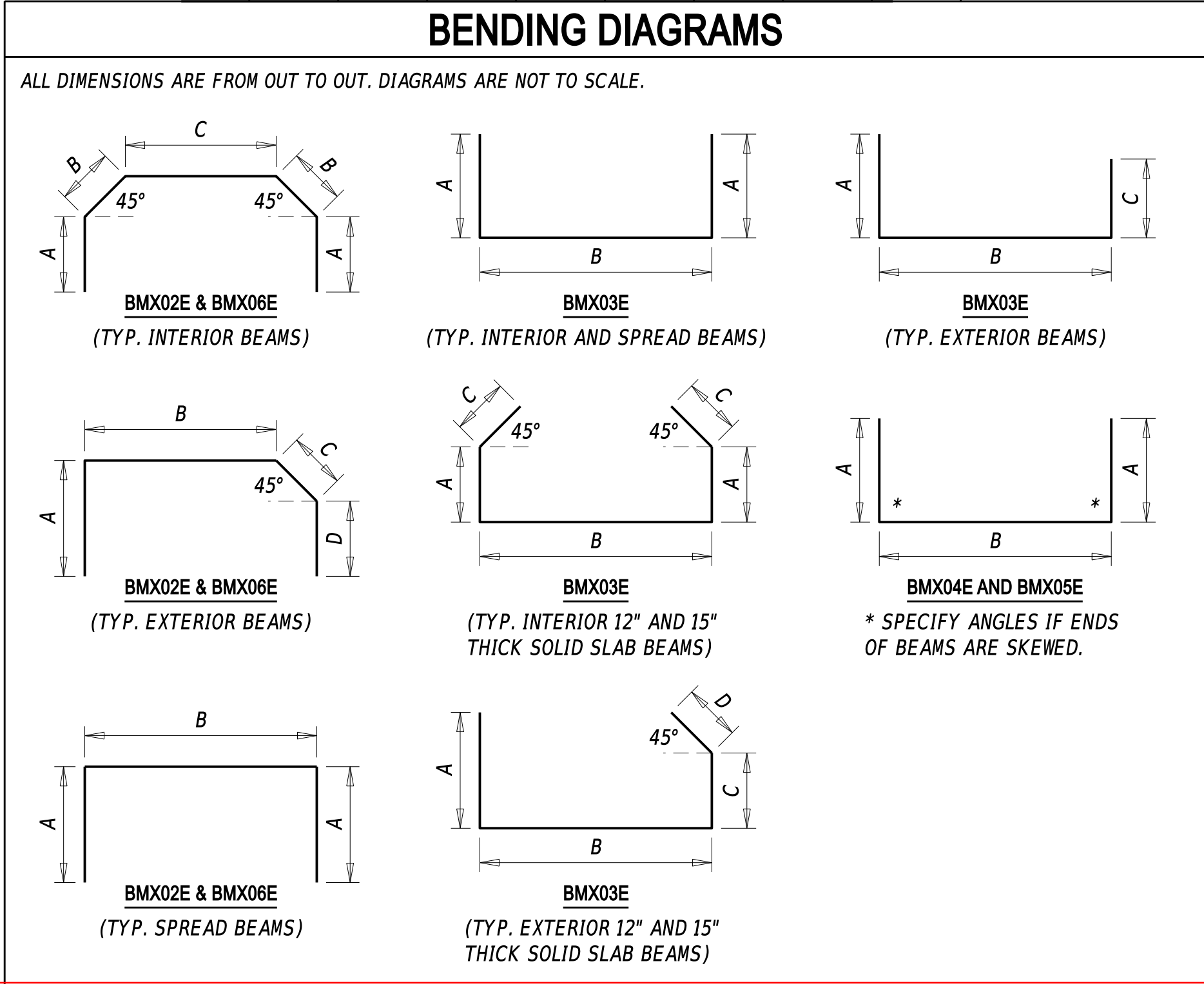


- ## SHEAR KEY NOTES

1. TO CREATE AN EXPOSED AGGREGATE SURFACE WITHIN THE SHEAR KEY, APPLY AN IN-FORM RETARDER FROM THE TOP OF BEAM TO BOTTOM OF THE SHEAR KEY ALONG THE FULL LENGTH OF BEAM ON BOTH SIDES. DO NOT ALLOW STAINS FROM OIL, GREASE OR OTHER CONTAMINATES TO BE PRESENT WITHIN THE SHEAR KEY. OMIT THE SHEAR KEY DETAIL, IN-FORM RETARDER, AND BM401E AND BM402E BARS ON THE EXTERIOR FACE OF THE FASCIA BEAMS.
2. INSTALL THE BM402E BARS PRIOR TO DELIVERING BEAMS TO THE CONSTRUCTION SITE. AN ALTERNATIVE METHOD TO THREADED BM402E BAR PROTRUDING INTO THE SHEAR KEY SPACE MAY BE SUBMITTED FOR APPROVAL BY THE ENGINEER.
3. STAGGER THE BM401E AND BM402E BARS ACCORDING TO THE DETAILS PROVIDED ON THIS SHEET TO FORM A NON-CONTACT LAP SPlice ALONG THE LENGTH OF THE SHEAR KEY.
4. TO CREATE A FILL PORT, RECESS THE SHEAR KEY 1" x 8". PLACE THE FILL PORTS AT BEAM ENDS AND AT A SPACING EQUAL TO THE LESSER OF QUARTER POINTS ALONG THE BEAM OR 12'-0".
5. VALUE ENGINEERING PROPOSALS ELIMINATING THE USE OF UHPC WILL NOT BE CONSIDERED.



REINFORCING BAR LIST							
STRAIGHT BARS				BENT BARS			
MARK	SIZE	QTY.	LENGTH	MARK	SIZE	QTY.	LENGTH
BM401E	4	----	1'-6"	BMX02E	----	----	----
BM402E	4	----	5½"	BMX03E	----	----	----
BMX01E	----	----	----	BMX04E	----	----	----
----	----	----	----	BMX05E	----	----	----
----	----	----	----	BMX06E	----	----	----



NOTE: ALL REINFORCEMENT FOR THE BOX or SLAB BEAM IS INCLUDED IN ITEM (insert appropriate beam item number). THE REINFORCING BAR LIST AND BENDING DIAGRAMS MUST BE SHOWN ON THE BOX or SLAB BEAM SHEETS AND BE SEPARATE FROM THE BRIDGE REINFORCEMENT BAR SHEET.

### DESIGNER NOTES

- REFER TO SECTION 106.9 FOR MORE INFORMATION ON THE DESIGN AND DETAILING OF PRESTRESSED CONCRETE BOX AND SLAB BEAMS. ALSO REFER TO SECTION 103.4.1.2 FOR MORE INFORMATION ON WHEN USE OF BOX OR SLAB BEAM IS APPROPRIATE.
- FOR MORE INFORMATION ON ALLOWABLE PRESTRESSING STRAND TYPE AND SIZES, REFER TO SECTION 205.4.4.
- REINFORCEMENT FOR BARRIERS TO BE CAST WITH PRESTRESSED CONCRETE BOX AND SLAB BEAMS NOT SHOWN FOR CLARITY. REFER TO DETAIL NO. 325.02 - 'BRIDGE RAILING DETAILS' FOR MORE INFORMATION.
- THE PRESTRESSED CONCRETE BOX AND SLAB BEAM SECTIONS AND STRAND CONFIGURATION AS SHOWN IN THESE DETAILS ARE RECOMMENDED. IF THE DESIGNER IS CONSIDERING USING DIFFERENT STRAND PATTERNS OR CREATING NON-SYMMETRICAL SECTIONS, NOTE THAT THE FABRICATION COSTS WILL LIKELY INCREASE SIGNIFICANTLY.
- THE DEPARTMENT PREFERS THE USE OF ULTRA HIGH PERFORMANCE CONCRETE (UHPC) TO CONNECT ADJACENT BEAMS. THE DETAILS PROVIDED HEREIN DEPICT TYPICAL DETAILS FOR UHPC SHEAR KEY CONNECTIONS DEVELOPED AND TESTED BY FHWA. APPROVAL MUST BE OBTAINED FROM THE BRIDGE DESIGN ENGINEER TO UTILIZE AN ALTERNATIVE METHOD OF CONNECTING ADJACENT BEAMS.
- THE DETAILS SHOWN ASSUME THAT 5" THICK CONCRETE DECK ON ADJACENT BEAMS WILL BE USED. HOWEVER, IN CONJUNCTION WITH UHPC SHEAR KEY CONNECTIONS, A C.I.P. DECK MAY NOT BE NECESSARY AND IS NOT PREFERRED. INSTEAD THE DESIGNER SHOULD CONSIDER AN OVERLAY, BITUMINOUS CONCRETE WEARING SURFACE, OR ALLOWING THE TOP FLANGE TO BECOME THE RIDING SURFACE. THE DESIGNER IS RESPONSIBLE FOR MODIFYING THE DETAILS HEREIN AS NECESSARY IF A 5" THICK CONCRETE DECK IS NOT UTILIZED.
- THE DESIGNER SHOULD NOTE ON THE PLANS THE TOTAL NUMBER OF INTERIOR AND EXTERIOR BEAMS NEEDED FOR THE PROJECT AND THE ESTIMATED WEIGHT OF THE BEAMS.
- DETAILS FOR STAY-IN-PLACE FORMS, DECK SLAB DETAIL AT PIER, AND DECK SLAB POUROVER AT ABUTMENT CAN BE FOUND IN DETAIL NO. 325.01 - CONCRETE DECK DETAILS.
- ENSURE WORKING DRAWINGS MEET ALL REQUIREMENTS AS OUTLINED IN SECTION 612.03(B)&(E) OF THE DELDOT STANDARD SPECIFICATIONS.
- THIS DETAIL DOES NOT SHOW POTENTIAL PRESTRESSING STRANDS EXTENDING INTO PIER DIAPHRAGM OR DECK SLAB POUROVER FOR CLARITY. IF REQUIRED PER DESIGN, REFER TO A5.12.3.3.9 FOR MORE INFORMATION ON DESIGN AND DETAILING FOR EXTENDING OF PRESTRESSING STRANDS INTO PIER DIAPHRAGM OR DECK SLAB POUROVER.
- THE DESIGNER MUST CONSIDER THE DIFFERENCES IN DECK THICKNESS BETWEEN CENTERLINE OF BEARINGS AND POINT OF MINIMUM THICKNESS ALONG THE BEAM DUE TO THE DIFFERENCE IN THE PROFILE TO CAMBERED SHAPE OF THE PRESTRESSED CONCRETE ADJACENT BOX AND SLAB BEAMS. THE FINAL GRADES AND SUBSTRUCTURE ELEVATIONS MUST BE ADJUSTED ACCORDINGLY.
- WHEN DEVELOPING THE UHPC SHEAR KEY DETAILS, FHWA SUCCESSFULLY TESTED BOX BEAMS WITH 5 ½" THICK WALLS. DELDOT HAS INCREASED THE PREFERRED BOX BEAM WALL THICKNESS TO 5 ¾" TO ALLOW FOR GREATER COVER OF REINFORCEMENT. IF THE DESIGNER PROPOSES TO USE 5 ½" THICK WALLS WITH UHPC SHEAR KEY DETAILS, THE DESIGNER MUST VERIFY THE REINFORCEMENT CLEARANCE.
- THE DESIGNER MUST EVALUATE THE NEED FOR INTERNAL DIAPHRAGM(S) IN BOX BEAMS OR VOIDED SLABS FOR STABILITY DURING TRANSPORTATION.

NOTE: THE DIMENSIONS ON THIS SHEET ARE RECOMMENDED. THE DESIGNER IS STILL RESPONSIBLE FOR ENSURING THAT THE DIMENSIONS SHOWN ON PLANS ARE ACCURATE AND PROJECT-SPECIFIC. DIMENSIONS FOR BMX06E ARE BASED ON 5" THICK CONCRETE DECK. REDUCE 'A' DIMENSION FOR BMX06E AS NECESSARY TO REDUCE CONGESTION IF MULTIPLE ROWS OF STRANDS WILL BE USED. IF PREFERRED, BMX06E BARS MAY BE COMBINED INTO ONE CONTINUOUS BAR BEND.

		DEPTH OF BOX BEAM																																		
MARK	WIDTH	LETTER	21"(I)	21"(E)	21"(S)	24"(I)	24"(E)	24"(S)	27"(I)	27"(E)	27"(S)	33"(I)	33"(E)	33"(S)	39"(I)	39"(E)	39"(S)	42"(I)	42"(E)	42"(S)	MARK	WIDTH	LETTER	12"(I)	12"(E)	12"(S)	15"(I)	15"(E)	15"(S)	18"(I)	18"(E)	18"(S)	21"(I)	21"(E)	21"(S)	
BMX02E	36"	A	0'-7"	1'-1"	1'-1"	0'-10"	1'-4"	1'-4"	1'-1"	1'-7"	1'-7"	1'-7"	2'-1"	2'-1"	2'-1"	2'-7"	2'-7"	2'-7"	2'-4"	2'-10"	2'-10"	BMX02E	36"	A	0'-2½"	0'-8"	0'-8"	0'-5½"	0'-11"	0'-11"	0'-4"	0'-10"	0'-10"	0'-7"	1'-1"	1'-1"
		B	0'-8"	2'-2"	2'-8"	0'-8"	2'-2"	2'-8"	0'-8"	2'-2"	2'-8"	0'-8"	2'-2"	2'-8"	0'-8"	2'-2"	2'-8"	0'-8"	2'-2"	2'-8"	2'-8"			B	0'-8"	2'-2"	2'-8"	0'-8"	2'-2"	2'-8"	0'-8"	2'-2"	2'-8"	0'-8"	2'-2"	2'-8"
		C	1'-8½"	0'-8"	----	1'-8½"	0'-8"	----	1'-8½"	0'-8"	----	1'-8½"	0'-8"	----	1'-8½"	0'-8"	----	1'-8½"	0'-8"	----	----			C	1'-8½"	0'-8"	----	1'-8½"	0'-8"	----	1'-8½"	0'-8"	----	1'-8½"	0'-8"	----
		D	----	0'-11"	----	----	1'-2"	----	----	1'-5"	----	----	1'-11"	----	----	2'-5"	----	----	----	2'-8"	----			D	----	0'-2½"	----	----	0'-5½"	----	----	0'-8"	----	----	0'-11"	----
	48"	A	0'-7"	1'-1"	1'-1"	0'-10"	1'-4"	1'-4"	1'-1"	1'-7"	1'-7"	1'-7"	2'-1"	2'-1"	2'-1"	2'-7"	2'-7"	2'-7"	2'-4"	2'-10"	2'-10"		48"	A	0'-2½"	0'-8"	0'-8"	0'-5½"	0'-11"	0'-11"	0'-4"	0'-10"	0'-10"	0'-7"	1'-1"	1'-1"
		B	0'-8"	3'-2"	3'-8"	0'-8"	3'-2"	3'-8"	0'-8"	3'-2"	3'-8"	0'-8"	3'-2"	3'-8"	0'-8"	3'-2"	3'-8"	0'-8"	3'-2"	3'-8"	3'-8"			B	0'-8"	3'-2"	3'-8"	0'-8"	3'-2"	3'-8"	0'-8"	3'-2"	3'-8"	0'-8"	3'-2"	3'-8"
		C	2'-8½"	0'-8"	----	2'-8½"	0'-8"	----	2'-8½"	0'-8"	----	2'-8½"	0'-8"	----	2'-8½"	0'-8"	----	2'-8½"	0'-8"	----	----			C	2'-8½"	0'-8"	----	2'-8½"	0'-8"	----	2'-8½"	0'-8"	----	2'-8½"	0'-8"	----
		D	----	0'-11"	----	----	1'-2"	----	----	1'-5"	----	----	1'-11"	----	----	2'-5"	----	----	----	2'-8"	----			D	----	0'-2½"	----	----	0'-5½"	----	----	0'-8"	----	----	0'-11"	----
BMX03E	36"	A	0'-11"	1'-5"	1'-5"	1'-2"	1'-8"	1'-8"	1'-5"	1'-11"	1'-11"	1'-11"	2'-5"	2'-5"	2'-5"	2'-11"	2'-11"	2'-11"	2'-8"	3'-2"	3'-2"	BMX03E	36"	A	0'-2½"	0'-8"	0'-8"	0'-5½"	0'-11"	0'-11"	0'-8"	1'-2"	1'-2"	0'-11"	1'-5"	1'-5"
		B	2'-8"	2'-8"	2'-8"	2'-8"	2'-8"	2'-8"	2'-8"	2'-8"	2'-8"	2'-8"	2'-8"	2'-8"	2'-8"	2'-8"	2'-8"	2'-8"	2'-8"	2'-8"	2'-8"			B	2'-8"	2'-8"	2'-8"	2'-8"	2'-8"	2'-8"	2'-8"	2'-8"	2'-8"	2'-8"	2'-8"	2'-8"
		C	----	0'-11"	----	----	1'-2"	----	----	1'-5"	----	----	1'-11"	----	----	2'-5"	----	----	----	2'-8"	----			C	0'-8"	0'-2½"	----	0'-8"	0'-5½"	----	----	0'-8"	----	----	0'-11"	----
		D	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	2'-8"	----			D	----	0'-8"	----	----	0'-8"	----	----	----	----	----	----	----
	48"	A	0'-11"	1'-5"	1'-5"	1'-2"	1'-8"	1'-8"	1'-5"	1'-11"	1'-11"	1'-11"	2'-5"	2'-5"	2'-5"	2'-11"	2'-11"	2'-11"	2'-8"	3'-2"	3'-2"		48"	A	0'-2½"	0'-8"	0'-8"	0'-5½"	0'-11"	0'-11"	0'-8"	1'-2"	1'-2"	0'-11"	1'-5"	1'-5"
		B	3'-8"	3'-8"	3'-8"	3'-8"	3'-8"	3'-8"	3'-8"	3'-8"	3'-8"	3'-8"	3'-8"	3'-8"	3'-8"	3'-8"	3'-8"	3'-8"	3'-8"	3'-8"	3'-8"			B	3'-8"	3'-8"	3'-8"	3'-8"	3'-8"	3'-8"	3'-8"	3'-8"	3'-8"	3'-8"	3'-8"	3'-8"
		C	----	0'-11"	----	----	1'-2"	----	----	1'-5"	----	----	1'-11"	----	----	2'-5"	----	----	----	2'-8"	----			C	0'-8"	0'-2½"	----	0'-8"	0'-5½"	----	----	0'-8"	----	----	0'-11"	----
		D	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	2'-8"	----			D	----	0'-8"	----	----	0'-8"	----	----	----	----	----	----	----
BMX04E	36"	A	5'-9"	5'-9"	5'-9"	5'-9"	5'-9"	5'-9"	5'-9"	5'-9"	5'-9"	5'-9"	5'-9"	5'-9"	5'-9"	5'-9"	5'-9"	5'-9"	5'-9"	5'-9"	5'-9"	BMX04E	36"	A	5'-9"	5'-9"	5'-9"	5'-9"	5'-9"	5'-9"	5'-9"	5'-9"	5'-9"	5'-9"	5'-9"	
		B	2'-6"	2'-6"	2'-6"	2'-6"	2'-6"	2'-6"	2'-6"	2'-6"	2'-6"	2'-6"	2'-6"	2'-6"	2'-6"	2'-6"	2'-6"	2'-6"	2'-6"	2'-6"	2'-6"			B	2'-6"	2'-6"	2'-6"	2'-6"	2'-6"	2'-6"	2'-6"	2'-6"	2'-6"	2'-6"	2'-6"	
	48"	A	5'-9"	5'-9"	5'-9"	5'-9"	5'-9"	5'-9"	5'-9"	5'-9"	5'-9"	5'-9"	5'-9"	5'-9"	5'-9"	5'-9"	5'-9"	5'-9"	5'-9"	5'-9"	5'-9"		48"	A	5'-9"	5'-9"	5'-9"	5'-9"	5'-9"	5'-9"	5'-9"	5'-9"	5'-9"	5'-9"	5'-9"	
		B	3'-6"	3'-6"	3'-6"	3'-6"	3'-6"	3'-6"	3'-6"	3'-6"	3'-6"	3'-6"	3'-6"	3'-6"	3'-6"	3'-6"	3'-6"	3'-6"	3'-6"	3'-6"	3'-6"			B	3'-6"	3'-6"	3'-6"	3'-6"	3'-6"	3'-6"	3'-6"	3'-6"	3'-6"	3'-6"	3'-6"	
BMX05E	36"	A	5'-9"	5'-9"	5'-9"	5'-9"	5'-9"	5'-9"	5'-9"	5'-9"	5'-9"	5'-9"	5'-9"	5'-9"	5'-9"	5'-9"	5'-9"	5'-9"	5'-9"	5'-9"	5'-9"	BMX05E	36"	A	5'-9"	5'-9"	5'-9"	5'-9"	5'-9"	5'-9"	5'-9"	5'-9"	5'-9"	5'-9"	5'-9"	
		B	1'-3"	1'-3"	1'-3"	1'-6"	1'-6"	1'-6"	1'-9"	1'-9"	1'-9"	2'-3"	2'-3"	2'-3"	2'-9"	2'-9"	2'-9"	3'-0"	3'-0"	3'-0"	3'-0"			B	0'-6"	0'-6"	0'-6"	0'-9"	0'-9"	0'-9"	1'-0"	1'-0"	1'-0"	1'-3"	1'-3"	
	48"	A	5'-9"	5'-9"	5'-9"	5'-9"	5'-9"	5'-9"	5'-9"	5'-9"	5'-9"	5'-9"	5'-9"	5'-9"	5'-9"	5'-9"	5'-9"	5'-9"	5'-9"	5'-9"	5'-9"		48"	A	5'-9"	5'-9"	5'-9"	5'-9"	5'-9"	5'-9"	5'-9"	5'-9"	5'-9"	5'-9"	5'-9"	
		B	1'-3"	1'-3"	1'-3"	1'-6"	1'-6"	1'-6"	1'-9"	1'-9"	1'-9"	2'-3"	2'-3"	2'-3"	2'-9"	2'-9"	2'-9"	3'-0"	3'-0"	3'-0"	3'-0"			B	0'-6"	0'-6"	0'-6"	0'-9"	0'-9"	0'-9"	1'-0"	1'-0"	1'-0"	1'-3"	1'-3"	
BMX06E	36"	A	0'-7"	1'-5½"	1'-5½"	0'-10"	1'-8½"	1'-8½"	1'-1"	1'-11½"	1'-11½"	1'-7"	2'-5½"	2'-5½"	2'-1"	2'-11½"	2'-11½"	2'-4"	3'-2½"	3'-2½"	----	BMX06E	36"	A	0'-2½"	1'-0½"	1'-0½"	0'-5½"	1'-3½"	1'-3½"	0'-4"	1'-2½"	1'-2½"	0'-7"	1'-5½"	1'-5½"
		B	1'-2"	1'-9½"	2'-8"	1'-2"	1'-9½"	2'-8"	1'-2"	1'-9½"	2'-8"	1'-2"	1'-9½"	2'-8"	1'-2"	1'-9½"	2'-8"	1'-2"	1'-9½"	2'-8"	----			B	1'-2"	1'-9½"	2'-8"	1'-2"	1'-9½"	2'-8"	1'-2"	1'-9½"	2'-8"	1'-2"	1'-9½"	2'-8"
		C	1'-0"	1'-2"	----	1'-0"	1'-2"	----	1'-0"	1'-2"	----	1'-0"	1'-2"	----	1'-0"	1'-2"	----	1'-0"	1'-2"	----	----			C	1'-0"	1'-2"	----	1'-0"	1'-2"	----	1'-0"	1'-2"	----	1'-0"	1'-2"	----
		D	----	0'-11"	----	----	1'-2"	----	----	1'-5"	----	----	1'-11"	----	----	2'-5"	----	----	2'-8"	----	----			D	----	0'-2½"	----	----	0'-5½"	----	----	0'-8"	----	----	0'-11"	----
	48"	A	0'-7"	1'-5½"	1'-5½"	0'-10"	1'-8½"	1'-8½"	1'-1"	1'-11½"	1'-11½"	1'-7"	2'-5½"	2'-5½"	2'-1"	2'-11½"	2'-11½"	2'-4"	3'-2½"	3'-2½"	----		48"	A	0'-2½"	1'-0½"	1'-0½"	0'-5½"	1'-3½"	1'-3½"	0'-4"	1'-2½"	1'-2½"	0'-7"	1'-5½"	1'-5½"
		B	1'-2"	2'-9½"	3'-8"	1'-2"	2'-9½"	3'-8"	1'-2"	2'-9½"	3'-8"	1'-2"	2'-9½"	3'-8"	1'-2"	2'-9½"	3'-8"	1'-2"	2'-9½"	3'-8"	----			B	1'-2"	2'-9½"	3'-8"	1'-2"	2'-9½"	3'-8"	1'-2"	2'-9½"	3'-8"	1'-2"	2'-9½"	3'-8"
		C	2'-0"	1'-2"	----	2'-0"	1'-2"	----	2'-0"	1'-2"	----	2'-0"	1'-2"	----	2'-0"	1'-2"	----	2'-0"	1'-2"	----	----			C	2'-0"	1'-2"	----	2'-0"	1'-2"	----	2'-0"	1'-2"	----	2'-0"	1'-2"	----
		D	----	0'-11"	----	----	1'-2"	----	----	1'-5"	----	----	1'-11"	----	----	2'-5"	----	----	2'-8"	----	----			D	----	0'-2½"	----	----	0'-5½"	----	----	0'-8"	----	----	0'-11"	----